



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

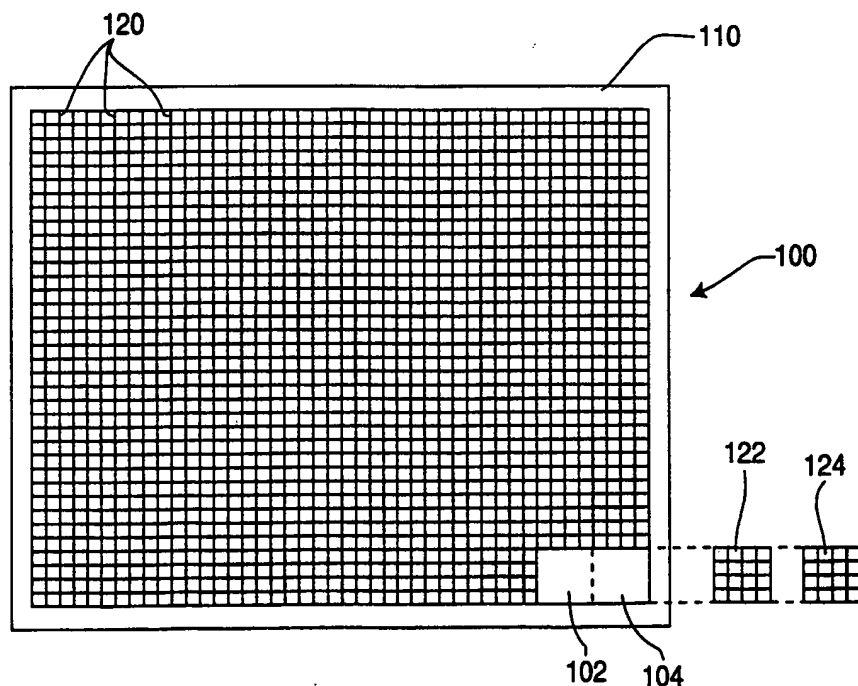
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(71) Applicant: SARNOFF CORPORATION [US/US]; 201 Washington Road, CN5300, Princeton, NJ 08543-5300 (US).			
(72) Inventors: MATTHIES, Dennis, Lee; 387 Nassau Street, Princeton, NJ 08540 (US). STEWART, Roger, G.; 3 Skik Drive, Neshanic Station, NJ 08853 (US). ATHERTON, James, H.; 45 Everitts Road, Ringoes, NJ 08551 (US). BECHIS, Dennis, J.; 525 Andrea Place, Yardley, PA 19067 (US). BUSTA, Heinz, H.; 2406 Hunters Glen Drive, Plainsboro, NJ 08536 (US). SHEN, Zilan; 20210 Heather Drive, Lawrenceville, NJ 08648 (US).		Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.	
(74) Agents: BURKE, William, J. et al.; Sarnoff Corporation, 201 Washington Road, CN5300, Princeton, NJ 08543-5300 (US).		(88) Date of publication of the international search report: 23 September 1999 (23.09.99)	

## (54) Title: TILED ELECTRONIC DISPLAY STRUCTURE

## (57) Abstract

A tiled display device is formed from display tiles having picture element (pixel) positions defined up to the edge of the tiles. Each pixel position has an organic light-emitting diode (OLED) active area which occupies approximately 25 percent of the pixel area. Each tile includes a memory which stores display data, and pixel driving circuitry which controls the scanning and illumination of the pixels on the tile. The pixel driving circuitry is located on the back side of the tile and connections to pixel electrodes on the front side of the tile are made by vias which pass through portions of selected ones of the pixel areas which are not occupied by the active pixel material. The tiles are formed in two parts, an electronics section and a display section. Each of these parts includes connecting pads which cover several pixel positions. Each connecting pad makes an electrical connection to only one row electrode or column electrode. The connecting pads on the display section are electrically connected and physically joined

to corresponding connecting pads on the electronics section to form a complete tile. Each tile has a glass substrate on the front of the tile. Black matrix lines are formed on the front of the glass substrate and the tiles are joined by mullions which have the same appearance as the black matrix lines. Alternatively, the black matrix lines may be formed on the inside surface of an optical integrating plate and the tiles may be affixed to the integrating plate such that the edges of the joined tiles are covered by the black matrix lines. A cathodoluminescent tile structure is formed from individual tiles that have multiple phosphor areas, a single emissive cathode and horizontal and vertical electrostatic deflecting grids which deflect the electron beam produced by the single cathode onto multiple ones of the phosphor areas.



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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/03374

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H01L27/15 H01L25/16 G09G3/30 H05B33/12 H01J1/62

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H01L G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 644 327 A (SALSMAN KENNETH E ET AL) 1 July 1997 cited in the application see column 4, line 43-54; figure 4 ---	1
A	US 5 703 394 A (WEI CHENGPING ET AL) 30 December 1997 see abstract; figures -----	1



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

25 June 1999

Date of mailing of the international search report

30. 07. 99

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk

Authorized officer

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 99/ 03374

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 3-13  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see additional sheet
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Through the claims are clear (except claim 13), the claims when taken as whole, lack concision, contrary to art. 6 PCT. This is due to the fact that in the independent claims, some features are repeated, while other features are omitted and new features are added. The invention has been set out in ten independent claims of different, through to a greater or lesser degree, overlapping scope. This set of claims put undue burden on thirds seeking to precisely establish the scope of the claims.

2. Due to the above lack of concision, the extend of the search to be carried out (PCT guidelines chapter III-2.1) cannot be precisely defined (consequence of lack of concision).

3. It appears furthermore that the description lists different and independent improvements of the prior art of displays. These improvements are directed to:

- electrical connection between the pixels and the circuit board whereby the pixel structure has a relatively small active region such that an electrical via may be formed within the pixel area without interfering with the active region of the pixel. The active region of each pixel may be offset from the center of the pixel area or can be centered in the pixel area.

- Image processing and display driving circuitry including circuitry for adjusting the current applied to a pixel in order to compensate for changes in the brightness performance of individual pixels.

- assembly of display tiles using a frame in which is mounted a rigid back panel or using a frame including a plurality of spring elements (self aligning structure). An optical structure is used to make the physical gaps between the tiles invisible to the viewer.

- a cathodoluminescent display tile including a single (row of) cathode(s) and at least one electrostatic deflection grid.

As far as it can be seen, these improvements would not be linked by a single inventive concept, so that the unity of the invention as it appears from the document as filed, is highly questioned.

4. According to art. 17(2)(b) the searching authority decided to restrict the search to claims 1 and 2.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/03374

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5644327 A	01-07-1997	EP 0834169 A	08-04-1998
		WO 9641327 A	19-12-1996
		US 5880705 A	09-03-1999
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US 5703394 A	30-12-1997	EP 0884782 A	16-12-1998
		CN 1167966 A	17-12-1998
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		US 5747363 A	05-05-1998
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